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adding a catalytic element for facilitating crystallization of an amorphous semiconductor thin film to the amorphous semiconductor thin film;

carrying out a first heat treatment to transform the amorphous semiconductor thin film into a crystalline semiconductor thin film by irradiating ultraviolet light or infrared light;

selectively providing the crystalline semiconductor thin film with an element of group VA;

carrying out a second heat treatment to getter the catalytic element into a region of the crystalline semiconductor thin film selectively provided with the element of group VA;

patterning the crystalline semiconductor thin film into at least one crystalline semiconductor island to become at least a channel formation region by removing at least the region of the crystalline semiconductor thin film selectively provided with the element of group VA; and

carrying out a third heat treatment for the at least one crystalline semiconductor island at 900 to 1200°C in a reducing atmosphere.

20. A method according to claim 19 wherein the element of group VA comprises phosphorus.

21. A method of fabricating a semiconductor device including a thin film transistor, wherein the thin film transistor is formed through the steps of:

adding a catalytic element for facilitating crystallization of an amorphous semiconductor thin film to the amorphous semiconductor thin film;

carrying out a first heat treatment to transform the amorphous semiconductor thin film into a crystalline semiconductor thin film by irradiating ultraviolet light or infrared light;

introducing phosphorus into the crystalline semiconductor thin film to form in the crystalline semiconductor thin film a source region and a drain region containing the phosphorus in the source region and the drain region;